

THE JOINT HURRICANE TESTBED

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**The Joint Hurricane Testbed is funded by the US
Weather Research Program in NOAA/OAR's Office of
Weather and Air Quality**

The Forecasters (Us)



How to
bridge the
“valley of
death”?

The Researchers (Them)



Joint Hurricane Testbed (JHT)

- ⦿ Bridge hurricane research and operations
- ⦿ Began in 2001 under the USWRP
- ⦿ **Our Mission:** successfully transfer new technology, research results & observational advances from research groups to operational centers
- ⦿ Testing is done at National Hurricane Center or Environmental Modeling Center

JHT: The Process

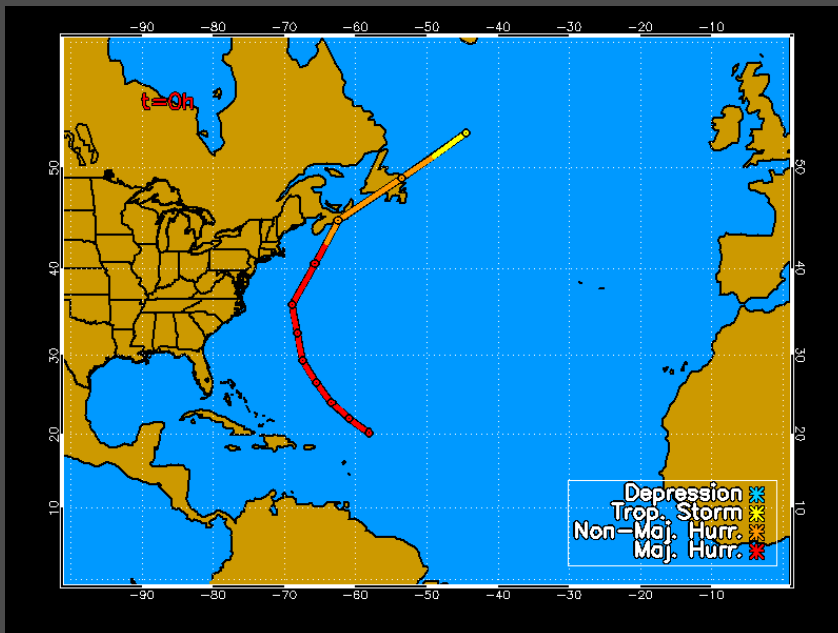
- Call for Proposals – drafted and disseminated (bi-annually)
 - Includes NHC, EMC, CPHC and JTWC's area of priorities
- Principal Investigators apply for funding through NOAA
- 7 member Steering Committee rate all proposals
 - Members represent the TC community
- Funded projects are tested during 1 or 2 hurricane seasons in conjunction with NHC/EMC Points of Contact
- At the project's end, each are evaluated by NHC/EMC staff
- Implementation of successful projects are then carried out by NHC/EMC staff/PIs

JHT: The statistics

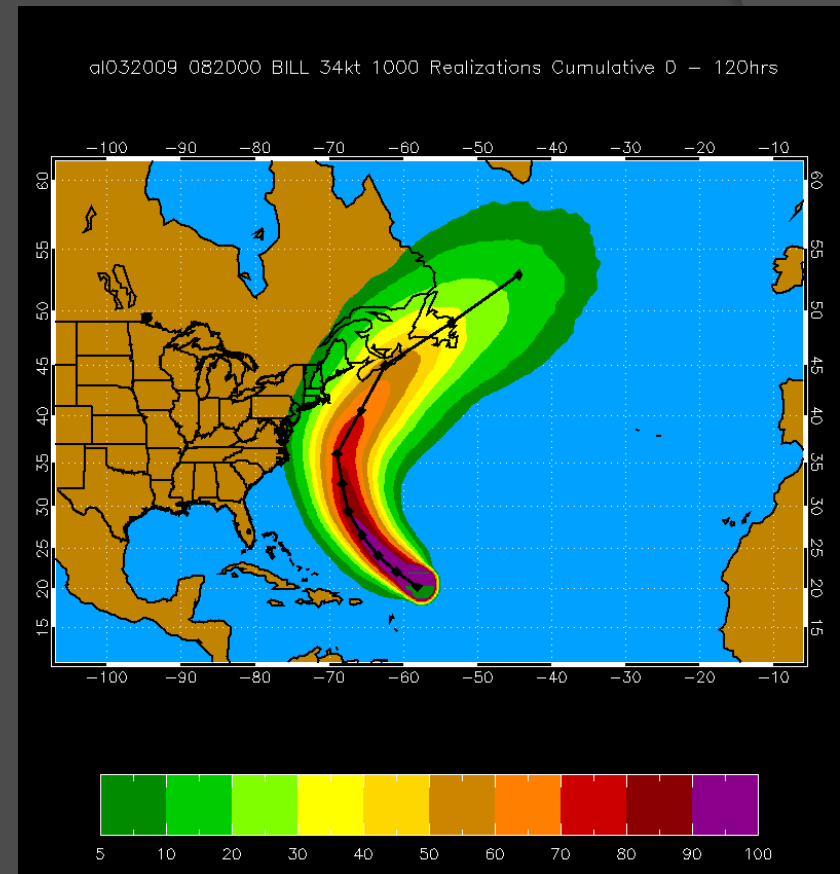
- Number of projects supported: 81
 - 74 completed
 - 46 accepted for operational implementation
 - 7 projects completed but rejected
 - 9 projects completed, deferred pending further investigation at EMC
 - 12 projects with decisions soon forthcoming
 - 7 projects started in Fall 2013
- Implementation
 - 41 projects implemented:
 - 11 numerical modeling projects implemented by EMC/NCO
 - 30 projects implemented by NHC
 - 3 projects accepted but not yet fully implemented by NHC
 - 2 projects unable to be implemented after acceptance

Wind Speed Probabilities

Hurricane Bill 20 Aug 2009 00 UTC



1000 Track Realizations



34 kt 0-120 h Cumulative Prob.

Wind Speed Probabilities

ZCZC MIAPWSAT4 ALL
TTAAOO KNHC DDHMM
HURRICANE WILMA PROBABILITIES NUMBER 20
NWS TPC/NATIONAL HURRICANE CENTER MIAMI FL
0900Z THU OCT 20 2005

...THIS IS AN EXPERIMENTAL PRODUCT FOR 2005...

AT 0900Z THE CENTER OF HURRICANE
WILMA WAS LOCATED NEAR LATITUDE 18.3 NORTH...
LONGITUDE 85.0 WEST WITH
MAXIMUM SUSTAINED WINDS NEAR 130 KTS...150 MPH...240 KM/HR.

CHANCES OF EXPERIENCING WIND SPEEDS OF AT LEAST

...34 KT (39 MPH... 63 KPH)...

...50 KT (58 MPH... 93 KPH)...

...64 KT (74 MPH...119 KPH)...

FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

PROBABILITIES FOR LOCATIONS ARE GIVEN AS IP(CP) WHERE

IP IS THE PROBABILITY OF THE EVENT BEGINNING DURING
AN INDIVIDUAL TIME PERIOD (INDIVIDUAL PROBABILITY)

(CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN
06Z THU AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

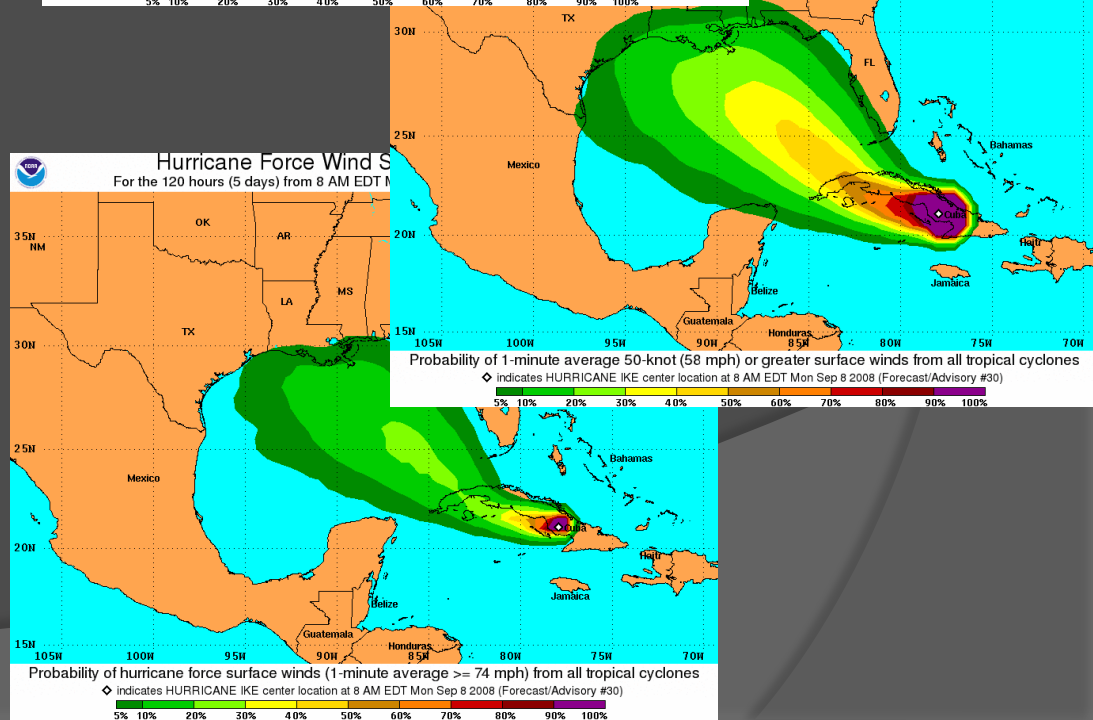
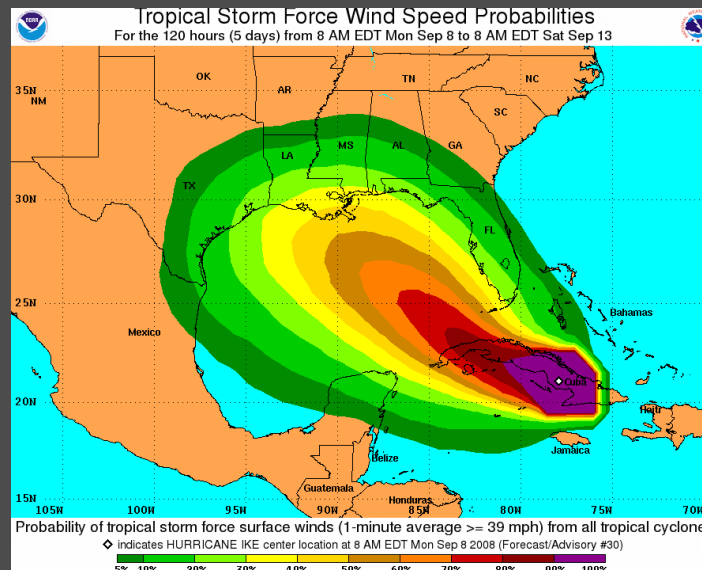
PROBABILITIES ARE GIVEN IN PERCENT

X INDICATES PROBABILITIES LESS THAN 0.5 PERCENT
LOCATIONS SHOWN WHEN THEIR TOTAL CUMULATED 5-DAY
PROBABILITY IS AT LEAST 2.5 PERCENT

Z INDICATES UNIVERSAL COORDINATED TIME (GREENWICH)

--- WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS ---

TIME PERIODS	FROM 06Z THU TO 18Z THU	FROM 18Z THU TO 06Z FRI	FROM 06Z FRI TO 18Z FRI	FROM 18Z FRI TO 06Z SAT	FROM 06Z SAT TO 18Z SUN	FROM 18Z SUN TO 06Z MON	FROM 06Z MON TO 18Z TUE
	(12)	(24)	(36)	(48)	(72)	(96)	(120)
LOCATION	KT						
MIAMI FL	34 X	X (X)	X (X)	2 (2)	16 (18)	23 (41)	5 (46)
MIAMI FL	50 X	X (X)	X (X)	X (X)	6 (6)	11 (17)	3 (20)
MIAMI FL	64 X	X (X)	X (X)	X (X)	2 (2)	5 (7)	1 (8)
KEY WEST FL	34 X	X (X)	2 (2)	7 (9)	26 (35)	18 (53)	3 (56)
KEY WEST FL	50 X	X (X)	X (X)	1 (1)	14 (15)	11 (26)	1 (27)
KEY WEST FL	64 X	X (X)	X (X)	X (X)	8 (8)	5 (13)	1 (14)
MARCO ISLAND	34 X	X (X)	X (X)	5 (5)	20 (25)	23 (48)	4 (52)
MARCO ISLAND	50 X	X (X)	X (X)	1 (1)	10 (11)	12 (23)	2 (25)
MARCO ISLAND	64 X	X (X)	X (X)	X (X)	5 (5)	6 (11)	X (11)



2013-2014 Major JHT Activities - 6th round

⦿ June - November 2013

- Final season to test of projects

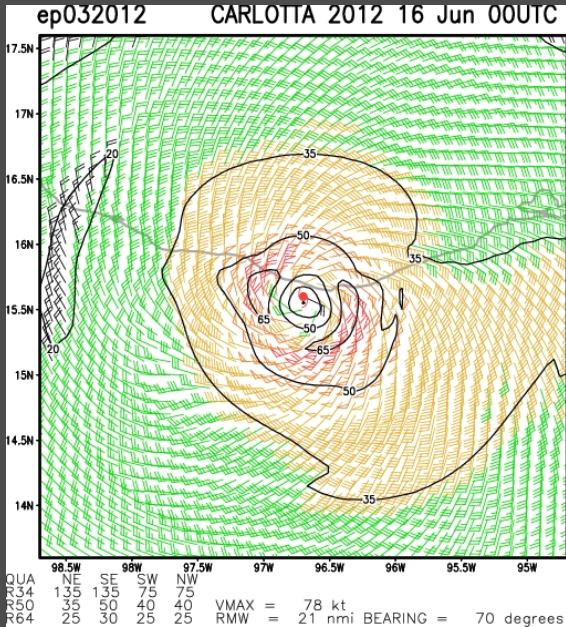
⦿ December 2013 – February 2014

- Final reports provided by PIs
- Feedback obtained by points-of-contact
- Implementation evaluation and decision

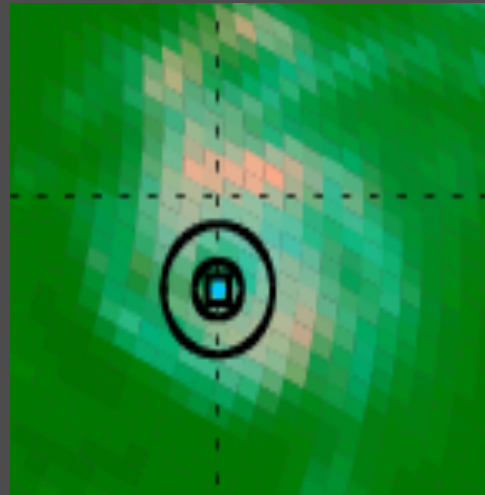
⦿ March-June 2014

- Implementation of accepted projects at NHC and EMC

Project Highlights - 6th round

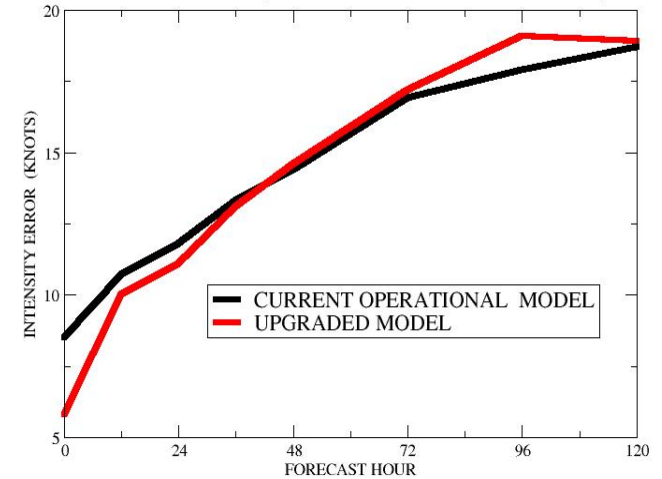


Surface winds: Knaff

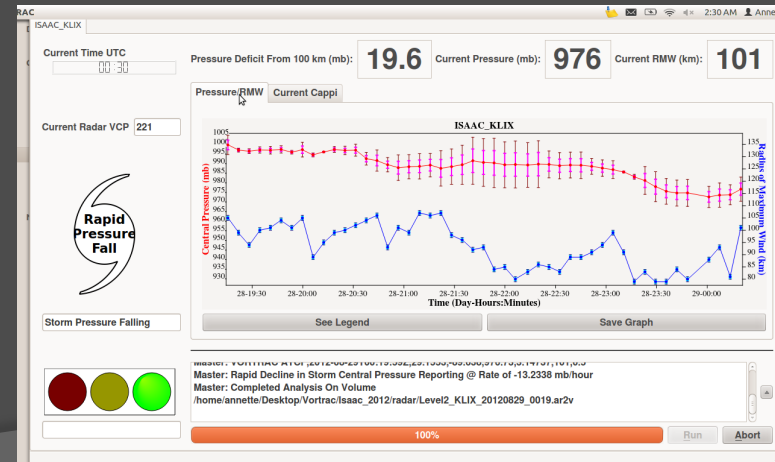
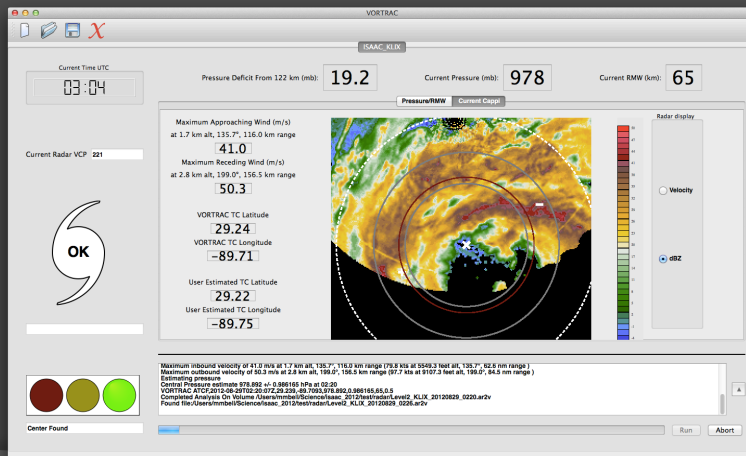


Rapid Intensity
Forecasting: Jiang

2010, 2011, 2012 Atlantic Average Intensity Error (knots)
Number of Cases : (539, 535, 528, 512, 489, 436, 372, 306)



Hurricane model upgrades: Bender



Radar-based central pressure: Lee/Bell

Factors Considered in NHC Decisions on Operational Implementation

- **Forecast or Analysis Benefit:** expected improvement in operational forecast and/or analysis accuracy
- **Efficiency:** adherence to forecaster time constraints and ease of use needs
- **Compatibility:** IT compatibility with operational hardware, software, data, communications, etc.
- **Sustainability:** availability of resources to operate, upgrade, and/or provide support

2012-2014 JHT activities - 7th Round

- ⦿ August 2012
 - Announcement of Funding Opportunity released
- ⦿ October 2012
 - 36 Letters of Intent reviewed
- ⦿ December 2012-January 2013
 - 22 Full proposals reviewed
- ⦿ February-April 2013
 - Rank and select proposals for funding - 7
 - Point-of-contacts established among NHC/EMC staff
 - Work with PIs to setup timelines for their projects
- ⦿ August - November 2013
 - Begin real-time testing during hurricane season
- ⦿ December 2013- March 2014
 - PI refine their projects and interact with points-of-contact
 - Present progress at Interdepartmental Hurricane Conf.

New JHT Projects 2013-2015: 7th round

Project Title	Principal Investigator(s)
A Visualization Application for Distributed ADCIRC-based Coastal Storm Surge, Inundation, and Wave Modeling	Brian Blanton and Rick Luettich (Univ. of N Carolina)
Improving the GFDL/GFDN Operational Tropical Cyclone Models at NOAA/NCEP and Navy/FNMOC	Isaac Ginis (Univ. of Rhode Island) and Morris Bender (NOAA/GFDL)
A Probabilistic TC Genesis Forecast Tool Utilizing an Ensemble of Global Models	Bob Hart and Henry Fuelberg (Florida State Univ.)
Improvement to the Satellite-based 37 GHz Ring Rapid Intensification Index	Haiyan Jiang (Florida Intl Univ.)
Guidance on Intensity Guidance	Dave Nolan (U of Miami/RSMAS) and Andrea Schumacher (CSU/CIRA)
Upgrades to the Operational Monte Carlo Wind Speed Probability Program	Andrea Schumacher (CSU/CIRA)
Integration of an Objective, Automated TC Center-fixing Algorithm Based on Multispectral Satellite Imagery into NHC/TAFB Operations	Tony Wimmers and Chris Velden (Univ. of Wisc./CIMSS)

The Joint Hurricane Testbed

The screenshot shows the website www.nhc.noaa.gov/jht for the National Hurricane Center. The page features a blue header with the NOAA logo and a search bar. A left sidebar contains various links including 'Local forecast by City, St or ZIP', 'Alternate Formats', 'Cyclone Forecasts', 'Marine Forecasts', 'Tools & Data', 'Development', 'Outreach & Education', 'Resources', 'Forecast Models', 'Breakpoints', 'Glossary | Acronyms', 'Frequent Questions', 'Our Organization', 'Contact Us', and 'Comments'. The main content area is titled 'JHT Overview' and includes a 'Mission Statement' section, a 'News' section with dates and project announcements, and a 'Main Activities' section with a bulleted list of tasks. A footer note mentions the 'Joint Hurricane Testbed Terms of Reference (PDF)'.

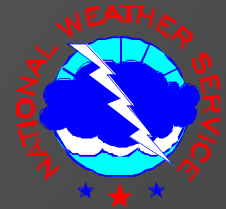
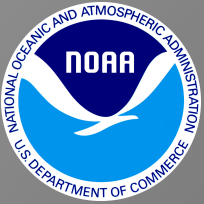
Rappaport et. al., 2012 - *BAMS*

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Its First Decade of Tropical Cyclone
Research-To-Operations Activities Reviewed

BY EDWARD N. RAPPAPORT, JIANN-GWO JIING, CHRISTOPHER W. LANDSEA,
SHIRLEY T. MURILLO, AND JAMES L. FRANKLIN

Collaboration between researchers, forecasters and technology specialists facilitated the development and implementation of numerous projects benefitting forecast operations.



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